



REMARKS

THE LIENHARD PATENT

In section 2 of the Office Action, the Examiner rejected claims 1-3, 6, 7, 11-14, and 31 under 35 U.S.C. §102(b) as being anticipated by the Lienhard patent.

The Lienhard patent discloses four magnetoresistors 1, 2, 3, and 4 forming a Wheatstone bridge 5. The Wheatstone bridge 5 is fed by a source 6 and has output terminals 7 and 8. An input current I_m in an input coil 9 produces a magnetic field H_m and a feedback current I_h in a feedback coil 10 produces a magnetic field H_h . These magnetic fields combine so to produce a resultant field $H_a = H_m - H_h$.

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INDEPENDENT CLAIM 1 - Applicant has argued several points of distinction between the Lienhard patent and independent claim 1.

APPLICANT'S POINT 1 - As can be seen from Figure 1 of the Lienhard patent, the magnetic field produced by the input strap 9 is in the same direction at each of the four magnetoresistors 1, 2, 3, and 4. Therefore, the input coil 9 is not disposed as required by independent claim 1. That is, the input coil 9 disclosed in the Lienhard patent is not disposed with

respect to the first, second, third, and fourth magnetoresistors 1, 2, 3, and 4 so that a magnetic field is generated over two of the magnetoresistors in one direction, and so that a magnetic field is generated over the other two of the magnetoresistors in an opposite direction.

EXAMINER'S RESPONSE - The Examiner argues that, in the Lienhard patent, the coil 9 generates a field in one direction and the coil 10 generates a field in an opposite direction and that, therefore, the Lienhard patent discloses that a magnetic field is generated over two of the magnetoresistors in one direction and that a magnetic field is generated over the other two of the magnetoresistors in an opposite direction.

However, even if the input strap as recited in independent claim 1 can be read to include both the input coil 9 and the feedback coil 10 disclosed in the Lienhard patent, the magnetoresistors disclosed in the Lienhard patent do not experience separate fields as do the magnetoresistors disclosed in the present application. As shown in Figure 2 of the present application, the input strap 30 has a first segment running alongside the magnetoresistors 14 and 16 in one direction and a second segment running alongside the magnetoresistors 18 and 20

in the other direction. Accordingly, because current runs through the first segment in one direction and current runs through the second segment in an opposite direction, the magnetoresistors 14 and 16 experience a magnetic field in one direction and the magnetoresistors 18 and 20 experience a magnetic field in the opposite direction.

The Lienhard patent discloses no such relationship between any of its coils and the magnetoresistors 1-4 so that two of the magnetoresistors 1-4 experience a magnetic field in one direction and so that the other two magnetoresistors 1-4 experience a magnetic field in an opposite direction.

Also, the magnetoresistors 1-4 experience only one magnetic field, i.e., the resultant magnetic field H_a . Indeed, even the Lienhard patent recognizes that the magnetoresistors 1-4 experience only one magnetic field when it discloses at column 2, lines 51-54 that "[t]he Wheatstone bridge 5 is fed by a current- or voltage-source 6, and constitutes a magnetic transducer having output terminals 7 and 8, which is subjected to an external magnetic field H_a ." The Lienhard patent does

not disclose that the magnetoresistors 1-4 experience separate magnetic fields H_a and H_h .

The finite delay mentioned by the Examiner is immaterial. Applicant does not argue that the magnetic fields H_a and H_h cancel and that, therefore, the magnetoresistors 1-4 are not subjected to magnetic fields in different directions. Applicant argues that the magnetic fields produced by the input coil 9 and the feedback coil 10 combine to form a resultant field having a single direction and that the magnetoresistors 1-4 experience only this resultant field.

Accordingly, the Lienhard patent does not disclose magnetoresistors experiencing magnetic fields in different directions as recited in independent claim 1. Therefore, the Lienhard patent does not anticipate independent claim 1 and dependent claims 2, 3, 6, 7, and 31.

APPLICANT'S POINT 2 - Because the Examiner argues that the magnetoresistors 1-4 experience the magnetic fields H_a and H_h separately, the Examiner points to the combination of the input coil 9 and the feedback coil 10 as the input strap of independent claim 1. Thus, the Examiner, in effect, argues that both the input coil

9 and the feedback coil 10 are coupled between the first and second isolator input terminals.

However, this interpretation of the Lienhard patent is incorrect. If the input coil 9 is coupled between first and second isolator input terminals, the feedback coil 10 is not likewise coupled between these first and second isolator input terminals. The feedback coil 10 is at most coupled between first and second isolator output terminals, assuming that the arrangement disclosed in the Lienhard patent provides isolation. Moreover, the feedback coil 10 is a feedback coil, not an input coil.

EXAMINER'S RESPONSE - The Examiner argues that, because the input coil 9 and the feedback coil 10 are magnetically coupled, and because the input coil 9 is coupled between the first and second isolator input terminals, the feedback coil 10 is also coupled between the first and second isolator input terminals. However, the Lienhard patent does not show that the feedback coil 10 is coupled between the first and second isolator input terminals. Moreover, it is not even correct to say that the feedback coil 10 is magnetically coupled between the first and second isolator input terminals.

Accordingly, the Lienhard patent does not disclose an input strap that is coupled between the first and second isolator input terminals and that generates a field in a first direction across two magnetoresistors and a field in an opposite direction across two other magnetoresistors as required by independent claim 1. Therefore, the Lienhard patent does not anticipate independent claim 1 and dependent claims 2, 3, 6, 7, and 31.

APPLICANT'S POINT 3 -Figures 4 and 5 of the Lienhard patent show magnetic fields H_b . However, the magnetic fields H_b are not produced by the input coil 9, and are instead produced by current flowing through the magnetoresistors 1, 2, 3, and 4. That is, the conductor 30 is the conductor that couples the magnetoresistors 1, 2, 3, and 4 together as a Wheatstone bridge.

EXAMINER'S RESPONSE - The Examiner argues that this point does not explain why the conductor 30 does not meet the input strap limitation of independent claim 1. The conductor 30 does not meet the input strap limitation of independent claim 1 because the conductor 30 is coupled between first and second power supply terminals and not between first and second isolator input terminals. To argue otherwise is to improperly change

the meaning of the limitations recited in independent claim 1.

INDEPENDENT CLAIM 11 - The Lienhard patent does not disclose the relationship between the input coil 9 and the magnetoresistors 1, 2, 3, and 4 as recited in independent claim 11. That is, the Lienhard patent does not show a first portion of the input coil 9 running alongside two of the magnetoresistors 1, 2, 3, and 4 and a second portion running alongside the other two magnetoresistors 1, 2, 3, and 4, and does not show that current supplied to the input coil 9 flows through the first portion in a first direction between the first and second ends of the integrated signal isolator and through the second portion in a second opposite direction between the first and second ends of the integrated signal isolator.

EXAMINER'S RESPONSE - The Examiner argues that the whole of the input coil 9 disclosed in the Lienhard patent runs alongside all resistors and, therefore, the input coil 9 must have a portion of a turn running alongside two of the magnetoresistors 1-4 and another portion of the turn running alongside the other two of the magnetoresistors 1-4.

The Examiner does not point to any figure in the Lienhard patent showing the relationship between the input coil 9 and the magnetoresistors 1-4 suggested by the Examiner. Figure 1 does not show that the input coil is alongside any of the magnetoresistors 1-4. Figure 2 merely shows that the current I_m in the input coil 9 flows in the same direction with respect to all of the magnetoresistors 1-4. As can be seen, the Lienhard patent does not disclose or show an input strap having at least one turn that is coupled between first and second isolator input terminals and that has a first portion running alongside two of the magnetoresistors 1-4 and a second portion running alongside the other two of the magnetoresistors 1-4 so that current is supplied through the first portion in one direction between the first and second ends of the integrated signal isolator and through the second portion in an opposite direction between the first and second ends of the integrated signal isolator.

Accordingly, the Lienhard patent does not anticipate independent claim 11 and dependent claims 12-14.

THE WAN PATENT

In section 3 of the Office Action, the Examiner rejected claims 1-17 and 32-35 under 35 U.S.C. §102(b) as being anticipated by the Wan patent.

The Wan patent discloses four magnetoresistors 24, 26, 28, and 30 forming a Wheatstone bridge. The Wheatstone bridge is fed by a source between a pad 44 and pads 40/48, and has output pads 36 and 52. An input strap 70 produces a magnetic field over all four magnetoresistors 24, 26, 28, and 30 in the same direction.

INDEPENDENT CLAIM 1 - Therefore, the input strap 70 is not disposed as required by independent claim 1. That is, the input strap 70 is not disposed with respect to the first, second, third, and fourth magnetoresistors 24, 26, 28, and 30 so that a magnetic field is generated over two of the magnetoresistors in one direction, and so that a magnetic field is generated over the other two of the magnetoresistors in an opposite direction. Instead, current flowing through the input strap 70, depending on polarity, enters the input strap 70 at the pad 66 and exits the input strap 70 at the pad 68. Accordingly, the current flows along all of the magnetoresistors 24, 26, 28, and 30 in the same direction

producing a magnetic field over all four of these magnetoresistors 24, 26, 28, and 30 in the same direction.

As a result, the Examiner points to the set/reset strap 54 of the Wan patent as the input strap of independent claim 1. The Wan patent refers to U.S. Pat. No. 5,247,278 in describing the set-reset function. As described in the '278 patent, a set-reset strap is used to set the direction of magnetization in magnetoresistive elements so as to eliminate any offset that might otherwise result. The duration of the current in set-reset strap is very short, less than a microsecond.

As can be seen, the Wan patent does not suggest that the set-reset strap 54 be used as an input strap coupled between first and second isolator input terminals so that circuits can be isolated from one another. Indeed, the Wan patent suggests just the opposite. Thus, those practicing in the art of magnetoresistive isolators will understand that a set-reset strap is not an input strap. This difference is exemplified, for example, by claim 9, which adds a set-reset strap to the other limitations of independent claim 1.

Additionally, the only time that the Wan patent uses the term "input" is in relation to the input strap 70. The Wan patent does not use the term "input" in relation to the set/reset strap 54.

Moreover, calling an elephant a lion does not make the elephant a lion. Similarly, calling the set/reset strap 54 an input strap does not make the set/reset strap 54 the input strap recited in independent claim 1.

EXAMINER'S RESPONSE - The Examiner argues that the set-reset strap 54 receives an input and, therefore, can be referred to as an input strap. The Examiner also argues that the magnetoresistors 1-4 see an input from the set-reset strap 54 and, therefore, the set-reset strap 54 can be again referred to as an input strap.

Both of these arguments, however, ignore the fact that independent claim 1 recites that the input strap is coupled between the first and second isolator input terminals of the integrated signal isolator. The set-reset strap 54 is not coupled between first and second isolator input terminals of an integrated signal isolator.

Accordingly, because the input strap 70 disclosed in the Wan patent does not meet the limitations

of independent claim 1, and because the set-reset strap 54 disclosed in the Wan patent is not an input strap that is coupled between first and second isolator input terminals of an integrated signal isolator, the Wan patent does not anticipate independent claim 1 and dependent claims 2-10 and 32-35.

INDEPENDENT CLAIM 11 - As seen above, the Wan patent does not disclose the relationship between the input strap 70 and the magnetoresistors 24, 26, 28, and 30 as recited in independent claim 11. That is, although the Wan patent shows a first portion of the input strap 70 running alongside two of the magnetoresistors 24, 26, 28, and 30 and a second portion running alongside the other two magnetoresistors 24, 26, 28, and 30, the Wan patent does not show that current supplied to the input strap 70 flows through the first portion in a first direction and through the second portion in a second opposite direction. Instead, the Wan patent shows that current supplied to the input strap 70 flows through the first and second portions in the same first direction.

The Examiner, however, argues that the set/reset strap 54 disclosed in the Wan patent meets these limitations. However, as discussed above, the set-reset strap 54 does not meet the input strap limitation.

That is, the Wan patent does not suggest that the set-reset strap 54 be coupled between first and second isolator input terminals of an integrated signal isolator for the purpose of isolating circuits from one another. Thus, those practicing in the art of magnetoresistive isolators will understand that a set/reset strap is not an input strap.

Additionally, the only time that the Wan patent uses the term "input" is in relation to the input strap 70. The Wan patent does not use the term "input" in relation to the set/reset strap 54.

Moreover, calling a set-reset strap an input strap does not make the set-reset strap an input strap.

EXAMINER'S RESPONSE - The Examiner argues that the set-reset strap 54 can be used as the input strap recited in independent claim 11 (and independent claim 1). However, none of the references suggest that a set-reset strap can be used as the input strap of an integrated signal isolator, and the Examiner has provided no evidence (other than applicant's own disclosure) that the device disclosed in the Wan patent can operate properly if the set-reset strap 54 is used as the input strap of an integrated signal isolator as recited in independent claim 11.

The Examiner further argues that applicant has pointed to no structural limitations that renders the device recited in the independent claims distinct from the device disclosed in the Wan patent. However, applicants have pointed to the structural limitation of "input strap" which is distinct from a set-reset strap, and to the structural limitation that the input strap is coupled between the first and second isolator input terminals of an integrated signal isolator, which the set-reset strap 54 is not.

Accordingly, for all of the reasons given above, the Wan patent does not anticipate independent claim 11 and dependent claims 12-17.

THE BLACK PATENT

The Examiner also relied on the Black patent in rejecting claims 8 and 15. However, the Black patent does not disclose or suggest the features of independent claims 1 and 11. Therefore, the combination of the Black patent with either the Lienhard patent or the Wan patent does not disclose or suggest the inventions of independent claims 1 and 11 as well as their dependent claims.

CONCLUSION

In view of the above, it is clear that the claims of the present application patentably distinguish over the art applied by the Examiner. Accordingly, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

Respectfully submitted,

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